Introduction

Tobacco use is one of the chief preventable causes of death in the world. Smoking already kills one in 10 adults worldwide. By 2030, the proportion may be one in six or 10 million deaths per year, more than any other single cause (1). About 1 billion tobacco-related deaths are projected for the 21st Century (2). About 70 % of those deaths will occur in developing countries and countries in transition, Serbia being one of these. Most people begin using tobacco before the age of 18. Over 30% of children smoked their first whole cigarette before the age of 10. One-half of young people who continue to smoke will die from smoking-related causes (3).

The European region, as defined by the World Health Organization (WHO), with only 15% of the world's population, faces nearly one third of the worldwide burden of tobacco-related diseases. While worldwide smoking prevalence has fallen from 45% to 30% over the past 30 years and has currently stabilized, in the European Region it remains at a level that is devastating for public health and for the health and well being of future generations. The negative trends in smoking prevalence among young people, women and lower socioeconomic groups, as well as the gap in tobacco control policies between Member States, are of particular concern. A lack of political will and the absence and ineffectiveness of tobacco control policies characterize a large part of the European region (4).

Health consequences of smoking

Before the advent of widespread smoking in the early 20th century, lung cancer was rare. The lung cancer epidemic that developed in the 20th century paralleled the increase in cigarette smoking, with about a 20-year lag, with twenty years being the latency period for lung cancer (5). If current patterns of smoking continue, about 500 million of the world's population alive today will eventually be killed by smoking, half of them in productive middle age (35 - 69), losing 20 to 25 years of life (1,2,6).

Smoking is an important risk factor for cardiovascular diseases (CVD) in middle age (7). The risk of lung cancer in non-smokers exposed to passive smoking is increased by between 20% and 30 %, and the excess risk of heart disease is 23% (3). All the toxins from cigarette smoke that reach a pregnant woman's blood go to her developing foetus and cause damage. Carbon monoxide prevents the foetus from getting enough oxygen. The carcinogens in cigarette smoke also damage the genetic material-DNA in placental and foetal cells. As a result, smoking (and exposure to passive smoke) by a pregnant woman increases the risk of birth defects in her baby and also increases the probability of spontaneous abortion or stillbirth by about one-third. Women who smoke are 3 to 4 times more likely than non-smokers to take more than one year to become pregnant, three times as likely to be infertile, and also have earlier menopause. Tobacco also increases the chance of abnormalities in the male's sperm and reduces its density and speed. It also causes male impotence (5).

Environmental tobacco smoke has large health impact. In addition, an estimated 3,000 non-smoking Americans die each year from lung cancer, and up to 300,000 children have respiratory tract infections due to increased susceptibility after exposure to second hand smoke (8). The risk of death from coronary heart disease increases by up to 30% among those exposed to environmental tobacco smoke at home or a work (9).

Tobacco use in Serbia and health effects

The survey "Health Status, Health Needs and Health Care Use in Serbia", carried out by the Public Health Institute of the Republic of Serbia, in co-operation with the republic's municipal and regional Institutes of Public Health in the year 2000, showed that among the adult population almost every second man (47.5%) and every third woman (33.1%) smokes (10). The prevalence of female current smokers in Serbia is the highest in Europe (3, 11, 12).

The survey also found that over one in four (44.2%) women between the ages of 35 and 44 years, smokes. For women of childbearing age, just less than one-half (49.7%) smoke. The majority of female smokers is within the lower socioeconomic groups. Among divorced women, over half (51.3%) smoke; among unemployed women 47.6% smoke, and for those with a High school education, the prevalence of smoking is 44.2%. A greater proportion of females living in urban areas smoke (38.5%) as compared to the female population living in rural areas (26.0%). The survey also found that one third of pregnant women smoke (13).

The results of another smoking prevalence survey, this one conducted in September 2002, showed that the 44.0% of the adult population are smokers, while 56.1% of respondents reported having smoked at least 100 cigarettes in their lifetime. The prevalence of current smokers is somewhat lower (43.4%) in urban areas than other areas (46.1%). Regionally, smoking prevalence is lowest in Belgrade (39.5%) and highest in Central Serbia (47.6%). Smoking prevalence is higher among men (52.9%) than among women (36.9%). The majority (56.2%) started to smoke at a young age. They had their first cigarette at 19 years of age, although a significant percent (14.0%) started at age of 14 years (14).

A school-based smoking prevalence study carried out in the year 2000 in Serbia indicates that almost one-half of students (49.1%) are current smokers (15). The prevalence among school children aged 15 years of age was 27.0% (16).

CVD and carcinomas are two main causes of premature mortality in Serbia as in much of the rest of Eastern and Central Europe. A recent burden of disease study in Serbia calculated the attributable mortality burden of tobacco use for cancers of oral cavity, oesophagus, pancreas, bladder and cervix, ischemic heart disease, cerebral vascular diseases (stroke) and chronic obstructive pulmonary disease (1, 10). A total of 106,000 deaths were recorded in the Republic of Serbia in 1999. Smoking-attributable mortality (SAM) accounted for 10% of all deaths (14).

In Serbia, tobacco cited as the risk factor associated with the greatest number of health problems and is responsible for 13.7% of the total years of life lost (YLL) due to mortality (18% for males; 7.9% for females) (10). The study also indicated that burden is greatest in lower ages and declines with an increase in age.

Most of the tobacco-related morbidity and mortality is due to lung cancer, ischemic heart disease, stroke and chronic obstructive pulmonary disease (COPD). Smoking cigarettes is responsible for 62% (age group 80 years and over) to 90.6% (age group 35 to 39 years) of total YLL for males and 18.1% (age group 80 years and over) to 80.2% (age group of 35 to 39 years) of total YLL for females who died from lung cancer. For COPD the proportion of total YYL attributable to tobacco for males is 54.2% for the age group of 80 years and over, and 87.4% for the age group of 35 to 39 years; for females the proportion of total YYL attributable to tobacco is 17.2% for the age group of 80 years and over, and 79.2% for the age group of 35 to 39 years.

The greatest proportion of tobacco burden is associated with lung cancer: more than 80% of total disability-adjusted life years (DALY) attributable to lung cancer for males, and 90% for females. The values for younger age groups for females were greater than those for males. For other two selected conditions, ischemic heart disease and stroke, the attributed burden due to tobacco for males was two times higher than for females. The number of YLLs for those conditions was much higher for males, than for females and also connected to younger age group than for females, especially for ischemic heart disease (10).

Legislation

In the Republic of Serbia there are three laws that regulate the manufacturing, advertising and marketing, and place of consumption of tobacco products. The first, a law passed in 1991 about the sale of food products, includes regulations concerning tobacco advertising. According to Article 17, the advertising of tobacco products is banned if the slogan used includes the words "cigarette", "tobacco" or "smoking", or their synonyms. The law states that "the advertising of tobacco and tobacco products is restricted in the press, radio and television, movies, billboards, stickers, in public places, in books, magazines, calendars and clothes..."(11). In practice, however, there are ways of circumventing this regulation. For example, there are several TV ads and billboard campaigns that employ indirect advertising techniques: Fast cigarettes ("Fast-internet", "Buy it in the kiosk but it's not news"), Lucky Strike ("I choose"); Davidoff ("The more you now"); President ("Taste freedom"); West ("The power Brand", "Test it"); and Gauloise ("Liberty"). Cultural and sporting events continue to be sponsored by tobacco companies (Lucky Strike Hot Summer Cool Jazz Festival; Lucky Strike Urban Experience, Winston as sponsor of the Yugoslav National Basketball League as Winston YUBA League, etc.). In the last three years advertising has become more aggressive, engaging several youth celebrities in promotional campaigns.

The second law (first enacted in 1988, revised in 1991, and revised for a second time in 1995) regulates smoking in public places. Under this legislation, smoking is banned in all public places (schools, health institutions, official buildings). This law is however impossible to enforce in practice and is not obeyed. There is probably not a single person who was charged for not obeying the law.

In March 2003 a new Law on Tobacco Production and Sale was passed by the Republic of Serbia's Parliament. It brought several major changes to the manner in which tobacco products are manufactured and sold. It includes a provision for banning the sale of tobacco products to persons below 18 years of age; cigarettes package and advertising must also carry a health warning. Stickers showing a red circle and a diagonal line across a package of cigarettes have been posted in all kiosks, to remind consumers and retailers about the age limit for the sale of tobacco. But the regulation remains largely ignored.

Smoking has been banned in buses for almost 30 years. The national airline (JAT) banned smoking on all flights starting in 2002. Nonetheless, there is no smoking ban in airports, train stations or bus stations.

Market for tobacco products

The cigarette market in the Republic of Serbia is supplied by a wide range of domestic and foreign brands. Almost 120 foreign brands are available in Serbia. Some are from

neighbouring countries (Macedonia, Bosnia & Herzegovina, Croatia) while others are manufactured by the major multinational companies (BAT, Reemstma, JTI, European Tobacco). Prior to year 2002, any legal entity could obtain a licence to import cigarettes. The new law requires a special permit for the production and importation of cigarettes (14).

There are two major Serbian cigarette producers in the republic. DIN is Serbia's leading cigarette producer, accounting for 54% of the local market. In 2002, the company sold 11.3 billion cigarettes. Set up in 1930, DIN employs 2,493 workers. It markets 12 cigarette brands, including Best and Classic. In late 2000, DIN launched a €30 million investment programme, expected to allow the company to boost annual production capacity from 12 billion to 14.5 billion cigarettes.

Serbia's second-largest cigarette maker DIV sold 1.6 billion cigarettes in 2002. The company was founded in 1885 and has the capacity to produce some 2.5 billion of cigarettes per year. It employs 568 workers. In 2001, DIV held a nine percent market share in Serbia with its 13 cigarette brands including Morava, Formula and Vikend (17).

In September 2003, the Serbian Privatisation Agency and Phillip Morris signed a €518 million strategic partnership agreement between the Serbian tobacco company Tobacco Industry Nis (DIN) and Philip Morris (18). Philip Morris Holland B.V., a unit of Altria Group Inc., is the world's largest cigarette producer. Its leading cigarette brands include Marlboro, L&M, Parliament and Eve. In 2002, Altria Group reported $80.4 billion in net revenues, with cigarette sales accounting for $47 billion of the sum.

The Government also reached an agreement with British American Tobacco for the sale of DIV. British American Tobacco Serbia is part of British American Tobacco PLC. BAT PLC manages 84 cigarette plants in 64 countries worldwide, with annual cigarette sales of 777 billion units. In 2002, the group posted net revenues of €15.1 billion. Its top cigarette brands include Lucky Strike, Pall Mall, Dunhill, Rothmans, Lord and Kent.

Smuggling

The last decade, during the previous regime, illegal sales of cigarettes become a source of profits for individuals who were closely tied to the regime. The illegal sale of smuggled cigarettes in retail stores and on the streets was not prosecuted. During 2000, the new government began to address illegal imports. In that year, approximately 400,000 packs of cigarettes were seized during police/customs raids. The volume of seized contraband doubled during the following year (14).

The Economics of Tobacco

The tobacco industry uses economic arguments to persuade governments, the media and general population that smoking benefits the economy. It claims that if tobacco control measures are introduced, tax revenues will fall, jobs will be lost and there will be great hardship to the economy, but they never mention the economics costs which tobacco inflicts upon every country. For example in the USA (1999 year) smoking accounted for over 6% of total health care expenses (3).

A study on the economics of tobacco use in Serbia supported by the World Bank estimated that 2.4% of all costs paid by the Health Insurance Fund for primary health care services, hospital episodes and drugs is attributable to cigarette smoking (14). However, the study authors caution that the costs are very much undervalued. The calculation did not take into consideration out-of-pocket expenses for health services and drugs, nor the economic losses due to sick leave related to tobacco-related illness and the decline in economic productivity. The impact of smoking on other diseases, such as low birth weight and premature births, respiratory diseases (emphysema, bronchitis, TB) was also excluded. The costs do not include all costs attributable to long-term and home care for people suffering from smoking-related diseases, and the lost wages and productivity for both ill persons and the provider of care. Nor is there any value assigned to pain and suffering due to disability and premature death. The actual costs to the health care system and the society could be 10 times higher.

Policy and Interventions

Over the past few years there have been several campaigns about smoking prevention and cessation, based upon previous local and similar international campaigns and funded by international, national and local organizations. These have included: the international campaign QUIT & WIN, International Week of Resistance Campaign, Global Partnership for Tobacco Control Program, the 11th WCTOH Seed Grant "For clean air" Project (19, 20), Celebrate World and National No Tobacco Days, Campaign Tobacco free sports with the slogan "Find your challenge, do not hide behind a cigarette", the two national campaigns against smoking "Extinguish cigarette-extend life" and "More vitamins, less nicotine" (21).

A school-based health education program focusing on the theme of tobacco has been conducted from many years in kindergartens and elementary schools in Serbia.

But these campaigns and actions may be of limited benefit. They are not grounded in any strategy for tobacco control and smoking prevention and cessation; and, they are campaign-focused. Their format and content are not based on lessons learned from previous campaigns nor on evidence from evaluations and assessments of their effectiveness or results attained. Therefore, there has been a lot of effort expended, but no demonstration of the impact of all these actions.

In March 2003, the Ministry of Health of Republic of Serbia established the National Committee for Smoking Prevention. Its mandate to prepare a program for tobacco control and to co-ordinate all activities directed to smoking prevention and smoking cessation. The Commission has also been delegated the responsibility of developing a strategic plan for tobacco control in the Republic of Serbia. The strategy is presently in draft form, and is expected to be presented to the Ministry of Health in early 2004.

The Global Youth Tobacco Survey

In 1998 the World Health Organization, in collaboration with the US Centers for Disease Control and Prevention (CDC) and UNICEF, initiated an international project called the Global Youth Tobacco Survey (GYTS), designed to enhance knowledge about smoking behaviour, knowledge and attitudes among young people. To date the survey has been completed about 150 countries including ten in the WHO European Region.

The GYTS provides a mechanism by which countries can monitor tobacco use among 13-15 year old young people and guide the implementation and evaluation of tobacco prevention and control programs. It aims to understand and assess students' attitudes, knowledge and behaviours related to tobacco use and its health impact, including cessation, environmental tobacco smoke, media and advertising, minors' access and school curriculum. The GYTS addresses the following issues:

- Determines the level of tobacco use
- Estimates the age of initiation of cigarette use
- Estimates levels of susceptibility to become cigarette smokers
- Exposure to tobacco advertising
- Identifies key intervening variables, such as attitudes and beliefs on behavioural norms with regard to tobacco use among young people which can be used in prevention programs, and
- Assesses the extent to which smoking prevention programs are reaching school-based populations and establish the subjective opinions of those populations regarding such interventions.

In early 2003, Serbia implemented the GYTS. This marked the first time that an internationally accepted research methodology was used to measure prevalence of tobacco use among youth in Serbia, and to examine as well youth attitudes and perceptions about tobacco and the factors that affect the decision to smoke.

Methods

Sampling

The GYTS is a school-based survey, employing a two-stage cluster sample design to produce a nationally representative sample of students in the 7th and 8th grades of elementary school, and the 1st year of secondary school. The target group is students aged between 13 and 15 years.

The first-stage sampling frame consisted of all schools (primary and secondary) containing any of 7th, 8th grades and the 1st grade of secondary school. Schools were selected with probability proportional to school enrolment size. Sixty schools were selected out of a total of 1616 schools.

The second sampling stage consisted of a systematic equal probability sampling, with a random start, of classes from each school that participated in the survey. All classes in the selected school were included in the sampling frame. All students in the selected classes were eligible to participate in the survey.

A weighting factor was applied to each student record to adjust for non-response and for the varying probabilities of selection. For the 2003 Serbia GYTS, 4,377 questionnaires were completed in 60 schools. The school response rate was 100%, and the student response rate was 89.8%. The overall response rate was 89.8%.

Questionnaire

The questionnaire consists of two main parts: 88 Core questions (developed especially for the European region) and 4 optional questions on the possible background factors associated with tobacco use. The questionnaire was translated from English into Serbian. The questionnaire contained 92 multiple-choice questions. The core questions focused on seven topics:

- Smoking prevalence
- Minor's access
- Cessation
- Knowledge and attitudes
- Tobacco-related school-curriculum
- Media and advertising, and
- Environmental tobacco smoke.

Data Collection

Prior to data collection, the principals of all selected schools received a letter requesting their permission to conduct the survey. The information package sent to the schools included a letter of support for the GYTS from the Ministry of Health and the Ministry of Education, a short description on the survey's purposes and procedures, emphasizing the assurance of privacy and information letter about the GYTS for the parents.

Survey procedures were designed to protect the students' privacy by allowing for anonymous and voluntary participation. The self-administered questionnaire was administered in the classroom. Students recorded their responses directly on an answer sheet using a special pencil, which could be scanned by a computer.

The Institute of Public Health of Belgrade and Institute of Public Health of Serbia coordinated data collection. The survey was implemented by a research coordinating team endorsed by the National Committee for Smoking Prevention of the Republic of Serbia. This two-person team carried out the logistics planning and training of the field surveyors. Additional logistical support was provided through the Canadian Public Health Association's Belgrade office, which also funded the GYTS in Serbia.

There were 90 interviewers, employees of the municipal and regional Institutes of Public Health. The survey was supervised by 16 district coordinators, from the Institutes of Public Health (Beograd, Cuprija, Kragujevac, Kraljevo, Leskovac, Nis, Novi Sad, Pancevo, Pozarevac, Sabac, Sombor, Sremska Mitrovica, Uzice, Vranje, Zajecar, Zrenjanin) and the Institute of Oncology.

Data collection was carried out in April 2003. All survey answer sheets and school and classroom header sheets were sent to the Institute of Public Health of Belgrade for validation. After carrying out a quality control of the scan able answer sheets as well as verification and completion of other documentation, the survey materials were packed and sent to the CDC. Data scanning and data-file compilation were carried out at the CDC.

Statistical Analysis

The EPI Info 2000 statistical software package was used for the complex sampling design and weighting factors in the data set, to calculate standard errors and prevalence estimates. Percentage prevalence is described in this report giving the 95% confidence intervals (CI) for the estimates.

Results

Table 1A: Percent of students who smoke cigarettes, Serbia, GYTS, 2003

Category	Ever Smoked Cigarettes, Even One or Two Puffs	Age of Initiation <10, Ever Smoked Cigarettes	Current Use	Current Cigarette Smokers who Smoke:	
			Cigarettes -- Total	Hand-rolled cigarettes	Manufactured cigarettes
Total	54.7 (±4.1)	31.3 (±4.4)	16.3 (±3.2)	10.9 (±3.3)	92.5 (±2.1)
Sex					
Boy	54.4 (±4.1)	35.0 (±5.2)	15.5 (±3.2)	13.1 (±3.9)	90.5 (±2.6)
Girl	55.2 (±5.6)	27.2 (± 4.8)	16.8 (±4.1)	8.6 (±4.2)	94.1 (±3.8)
Region					
Belgrade	56.5 (±5.8)	30.4 (±6.3)	15.6 (±4.5)	7.5 (±3.7)	92.5 (±4.1)
Urban	56.8 (±5.7)	29.7 (±6.3)	18.3 (±4.7)	10.9 (±4.7)	93.6 (±2.5)
Rural	46.7 (±10.1)	38.5 (±7.9)	11.4 (±6.2)	15.3 (±7.1)	87.4 (±6.1)

More than half (54.7%) of the respondents reported ever having smoked cigarettes. Almost one-third (31.3%) reported initiating smoking before the age of 10 years (Table 1A). Among current smokers, 16.3% smoke cigarettes with 9 in 10 of these (92.5%) smoking manufactured cigarettes. One in ten current smokers (10.9%) reported to have smoked hand-rolled cigarettes. There was no statistical difference between boys and girls or by region.

Table 1B: Percent of students who use other tobacco products, Serbia, GYTS, 2003

Category	Current Use				
	Other Tobacco Products – Total	Cigars	Chew, snuff, dip	Pipe	Any Current Tobacco Use – Cigarettes + Other
Total	7.1 (±1.2)	6.5 (±1.1)	0.8 (±0.3)	1.4 (±0.5)	16.9 (±3.2)
Sex					
Boy	6.6 (±1.3)	5.6 (±1.1)	0.7 (±0.3)	2.0 (±0.7)	16.2 (±3.1)
Girl	7.5 (±1.7)	7.3 (± 1.6)	0.8 (±0.5)	0.7 (±0.5)	17.2 (±3.9)
Region					
Belgrade	8.2 (±2.6)	7.5 (±2.3)	1.1* (±0.4)	1.1 (±0.6)	16.3 (±4.8)
Urban	7.4 (±1.7)	6.9 (±1.5)	0.7 (±0.5)	1.5 (±0.8)	18.6 (±4.6)
Rural	5.0 (±1.5)	4.4 (±1.5)	0.7 (±0.3)	1.3 (±0.5)	12.2 (±5.9)

Among current smokers, 7.1% reported using other tobacco products; 6.5% of "current smoker" students smoke cigars. The use of chew, snuff, and dip is very low (0.8% among current smokers) and 1.4% of current smokers reported to have smoked a pipe (Table 1B). Boys (2.0%) were significantly more likely than girls (0.7%) to smoke tobacco in a pipe. There was no statistical difference by region.

Table 1C: Percent of students reporting smoking dependency and susceptibility, Serbia, GYTS, 2003

Category	Percent of current smokers who always have or feel like having a cigarette first thing in the morning	Percent of never smokers likely to initiate smoking during the next year
Total	15.6 (±5.7)	19.1 (±2.0)
Sex		
Boy	17.1 (±4.7)	16.6 (±2.8)
Girl	13.9 (±7.9)	22.0 (±3.4)
Region		
Belgrade	18.4 (±6.4)	16.6 (±4.8)
Urban	17.2 (±7.8)	18.4 (±2.4)
Rural	11.4 (±8.5)	23.0 (±4.5)

For current smokers, 15.6% reported that they always have or feel like having a cigarette first thing in the morning (Table1C). Almost 1 in 5 never smokers (19.1 %) stated that they will likely initiate smoking sometime during the next year. There was no statistical difference between boys and girls or by region.

Table 2: School Curriculum, Serbia, GYTS, 2003

Category	During past school year, percent had class where taught dangers of smoking	During past school year, percent had class where discussed reasons why people their age smoke	During past school year, percent had class where taught about the effects of smoking
Total	62.0 (±2.9)	40.9 (±2.9)	56.7 (±2.5)
Sex			
Boy	61.1 (±3.6)	38.9 (±3.9)	56.5 3.4)
Girl	63.2 (±2.9)	42.6 (±3.3)	56.9 (±3.3)
Region			
Belgrade	57.8 (±3.5)	39.5 (±3.5)	56.5 (±3.8)

Urban	63.0 (±4.5)	41.1 (±4.5)	56.8 (±3.4)
Rural	63.5 (±5.5)	42.0 (±4.7)	56.7 (±5.8)

Almost two-thirds (62.0%) of students were taught in classes about the dangers of smoking during past school year, and just over 4 in 10 (40.9%) had a class that discussed reasons why people their age smoke. More than half of the students (56.7%) had classes that taught about the effects of smoking (Table 2). There is no statistical difference between boys and girls or by region.

Table 3: Cessation, Serbia, GYTS, 2003

Category	Current Smokers		
	Percent desire to stop	Percent tried to stop this year	Received Help/Advice to Stop Smoking
Total	54.4 (±6.7)	77.8 (±4.9)	66.6 (±4.7)
Sex			
Boy	55.6 (±6.6)	78.6 (±6.7)	67.3 (±6.5)
Girl	53.4 (±10.3)	77.4 (±7.0)	66.8 (±7.3)
Region			
Belgrade	45.5 (±7.9)	72.7 (±7.4)	67.2 (±6.1)
Urban	57.4 (±9.3)	78.1 (±6.8)	66.5 (±6.8)
Rural	54.1 (±13.2)	85.2 (±5.4)	66.1 (±6.7)

Over half (54.4 %) of current smokers indicated they would like to stop smoking and more than three-quarters of them (77.8%) reported having tried to stop during the past year and failed (Table 3). There is no statistical difference between boys and girls or by region.

Table 4A: Environmental Tobacco Smoke, Serbia, GYTS, 2003

Category	Exposed to smoke in their home		Exposed to smoke from father in their home		Exposed to smoke from mother in their home		Exposed to smoke from sister/brother in their home		Exposed to smoke from best friend in their home		Exposed to smoke from others in their home	
	Never Smokers	Current Smokers	Never Smokers	Current Smokers	Never Smokers	Current Smokers	Never Smokers	Current Smokers	Never Smokers	Current Smokers	Never Smokers	Current Smokers
Total	96.4 (±1.1)	98.4 (±0.6)	61.0 (±2.6)	69.4 (±4.8)	50.4 (±3.0)	62.7 (±5.1)	16.3 (±2.7)	48.6 (±4.8)	24.3 (±3.3)	73.5 (±5.4)	93.1 (±1.4)	93.9 (±2.4)
Sex												
Boy	95.0 (±1.6)	99.3 (±1.0)	58.2 (±3.7)	71.5 (±6.6)	51.1 (±3.6)	59.0 (±6.6)	16.2 (±4.1)	46.6 (±7.4)	25.2 (±4.1)	72.4 (±5.4)	90.1 (±2.4)	95.7 (±2.4)
Girl	98.0 (±1.1)	97.9 (±1.2)	63.2 (±3.9)	66.8 (±8.4)	49.2 (±5.2)	65.9 (±7.5)	16.8 (±3.3)	48.8 (±9.6)	23.6 (±4.3)	74.4 (±8.5)	96.0 (±1.6)	92.3 (±4.3)
Region												
Belgrade	96.2 (±1.6)	99.3 (±1.2)	56.2 (±4.5)	65.6 (±10.0)	48.6 (±5.0)	71.2 (±6.7)	16.6 (±2.5)	43.5 (±7.5)	17.7 (±4.2)	71.5 (±5.8)	92.0 (±2.4)	95.4 (±2.3)
Urban	97.2 (±1.6)	97.9 (±0.9)	62.0 (±3.7)	69.8 (±6.5)	51.7 (±4.6)	60.6 (±7.1)	17.1 (±4.6)	51.2 (±6.8)	27.5 (±5.1)	75.0 (±7.7)	94.6 (±2.0)	93.4 (±3.6)
Rural	94.7 (±2.1)	99.3 (±1.2)	62.5 (±5.3)	73.1 (±3.9)	48.8 (±3.9)	60.8 (±11.2)	14.1 (±2.0)	43.4 (±6.4)	21.9 (±5.1)	69.8 (±5.4)	90.5 (±3.3)	94.2 (±3.3)

Over 9 in 10 students (96.4 % never smokers; 98.4% current smokers) are exposed to smoke in their home (Table 4A). For never smokers, over 6 in ten (61.0%) are exposed to smoke in the home from the father; for current smokers, this rises to almost 7 in 10 (69.4%). Just of half of never smokers (50.4%) are exposed to tobacco smoke as a result of the mother smoking at home; over 6 in 10 current smokers (62.7%) are exposed to tobacco smoke as a result of the mother smoking at home. Current smokers were almost three times more likely to be exposed to tobacco smoke from a sibling smoking at home (48.6% of current smokers versus 16.3% of never smokers are exposed to environmental tobacco smoke as a result of a brother or sister smoking in the home). The same pattern held tru for exposure to tobacco smoke from friends smoking in the home, with over 7 in 10 current smokers (73.5%) stating that they had been exposed to second hand smoke from best friends

smoking in the home; just over 2 in 10 never smokers (24.3%) stated that they had been exposed to second hand smoke from best friends smoking in the home. For both never smokers and current smokers, the exposure to environmental tobacco smoke as a result of "other people" smoking in their homes was extremely high (93.1% for never smokers; 93.9% for current smokers). There was no statistical difference between boys and girls or by region.

Table 4B: Environmental Tobacco Smoke, Serbia, GYTS, 2003

Category	Exposed to smoke from others in public places		Percent think smoking should be banned from public places		Definitely think smoke from others is harmful to them	
	Never Smokers	Current Smokers	Never Smokers	Current Smokers	Never Smokers	Current Smokers
Total	87.0 (±2.2)	96.5 (±1.6)	88.1 (±1.3)	43.2 (±8.4)	55.5 (±4.1)	30.3 (±4.7)
Sex						
Boy	85.2 (±2.9)	93.9 (±3.1)	89.1 (±2.3)	45.8 (±9.5)	57.8 (±5.8)	32.7 (±4.6)
Girl	88.7 (±2.7)	99.5 (±0.6)	87.0 (±2.2)	41.0 (±8.8)	53.1 (±5.3)	27.5 (±7.2)
Region						
Belgrade	87.6 (±3.6)	98.1 (±1.7)	87.2 (±2.9)	39.3 (±7.1)	56.5 (±3.6)	28.1 (±6.9)
Urban	88.0 (±3.5)	96.7 (±2.1)	87.8 (±1.7)	41.5 (±11.9)	53.9 (±5.9)	30.1 (±6.5)
Rural	84.1 (±3.0)	93.4 (±4.7)	89.6 (±2.6)	57.2 (±13.2)	58.5 (±10.0)	34.2 (±9.7)

Current smokers (96.5 %) were significantly more likely than never smokers (87.0%) to be exposed to smoke in public places (Table 4B). On the other hand, never smokers (88.1%) were significantly more likely, by a ratio of almost 2 to 1, than current smokers (43.2%) to think smoking should be banned in public places; and never smokers (55,5%) were significantly more likely than current smokers (30,3%) to think smoke from others is harmful to them.There was no statistically significant difference between boys and girls, or by region.

Table 5: Knowledge and Attitudes, Serbia, GYTS, 2003

Category	Think boys who smoke have more friends		Think girls who smoke have more friends		Think smoking makes boys look more attractive		Think smoking makes girls look more attractive	
	Never Smokers	Current Smokers	Never Smokers	Current Smokers	Never Smokers	Current Smokers	Never Smokers	Current Smokers
Total	11.2 (±2.2)	10.8 (±3.6)	10.0 (±2.2)	10.0 (±4.1)	8.0 (±2.1)	19.6 (±4.7)	5.0 (±1.6)	11.4 (±2.4)
Sex								
Boy	11.2 (±3.2)	10.9 (±3.6)	10.0 (±2.6)	10.9 (±3.6)	9.8 (±3.4)	20.7 (±4.6)	5.2 (±1.8)	14.9 (±3.9)
Girl	11.1 (±3.2)	10.7 (±5.4)	9.8 (±2.7)	8.8 (±6.8)	6.0 (±1.7)	18.3 (±6.8)	4.5 (±1.7)	7.8 (±3.3)
Region								
Belgrade	9.7 (±1.9)	11.0 (±4.4)	9.1 (±2.6)	9.4 (±4.2)	6.7 (±1.8)	20.4 (±4.4)	3.4 (±2.1)	12.1 (±5.1)
Urban	11.9 (±2.8)	10.2 (±4.9)	9.8 (±2.5)	9.6 (±5.9)	7.8 (±3.1)	17.9 (±6.6)	4.7 (±2.2)	8.5 (±2.8)
Rural	10.7* (±6.2)	13.4 (±7.1)	11.3 (±6.7)	12.2 (±6.0)	9.5 (±4.7)	26.5 (±7.7)	6.8 (±3.5)	24.7 (±7.0)

Attitudes concerning young people who smoke having more friends than non-smokers did not differ very much between never smokers and current smokers (11.2% for never smokers; 10.8% for current smokers) (Table 5). In contrast, current smokers were significantly more likely than never smokers to think boys who smoke are more attractive (19.6% for current smokers vs. 8.0% for never smokers). A similar pattern was noticed in terms of the proportion of current smokers and never smokers who think that girls who smoke are more attractive (11.4% for current smokers vs. 5.0% for never smokers). There was no significant different between boys and girls or across regions.

Table 6A: Media and Advertising, Serbia, GYTS, 2003

Category	Percent Saw Anti-Smoking Media Messages on Television	Percent Saw Anti-Smoking Media Messages on Billboards	Percent Saw Anti-Smoking Media Messages in Newspapers or Magazines	Percent Saw Anti-Smoking Media Messages at Sports Events, Fairs, Concerts or Community Events
Total	84.1 (±2.1)	52.1 (±2.5)	59.4 (±2.5)	69.7 (±2.3)
Sex				
Boy	84.2 (±2.5)	55.2 (±2.9)	60.7 (±3.2)	70.5 (±2.8)
Girl	83.8 (±2.4)	49.0 (±3.1)	58.3 (±3.7)	69.0 (±2.8)
Region				
Belgrade	83.8 (±2.8)	63.5 (±5.0)	61.4 (±1.9)	71.1 (±4.0)
Urban	83.6 (±3.1)	49.1 (±3.3)	57.6 (±3.8)	68.8 (±3.0)
Rural	85.7 (±4.7)	49.6 (±7.3)	62.6 (±5.9)	71.2 (±5.9)

More than 8 in 10 (84.1%) of all students (never and current smokers) said they had seen anti-smoking media messages on TV. Almost 7 in ten (69.7%) said they had seen anti-tobacco messages at public events; 59.4% in newspapers or magazines; and 52.1% on billboards (Table 6A). Anti-smoking messages on billboards were significantly higher in Belgrade (63.5%) than other regions. There was no significant difference between boys and girls.

Table 6B: Media and Advertising, Serbia, GYTS, 2003

Category	Percent Saw Pro-Tobacco Messages on Television	Percent Saw Pro-Tobacco Messages on Billboards	Percent Saw Pro-Tobacco Messages on Newspapers/Magazines	Percent Saw Pro-Tobacco Messages at Community Events/Social Gatherings
Total	89.8 (±1.7)	70.7 (±3.5)	80.4 (±1.4)	61.7 (±3.5)
Sex				
Boy	90.3 (±1.9)	71.3 (±4.0)	78.9 (±1.9)	60.8 (±3.6)
Girl	89.6 (±2.3)	70.1 (±4.4)	82.5 (±1.8)	62.7 (±4.0)
Region				
Belgrade	92.1 (±2.1)	80.7 (±4.3)	84.4 (±3.4)	86.8 (±2.8)
Urban	88.8 (±2.7)	71.7 (±4.7)	79.8 (±1.8)	81.0 (±4.5)
Rural	90.4 (±2.2)	57.7 (±9.7)	78.2 (±3.0)	78.3 (±2.9)

Almost 9 in 10 students (89.8%) said that they had been exposed to pro-tobacco messages on TV. Just over 8 in 10 students (80.4%) stated that they had been exposed to pro-tobacco messages in newspapers or magazines; 70.7% on billboards; and 61.7% at social events (Table 6B). Exposure to pro-tobacco messages on billboards was significantly higher in Belgrade than in other regions. There was no statistically significant difference between boys and girls.

Table 6C: Media and Advertising, Serbia, GYTS, 2003

Category	Percent Who Had Object With a Cigarette Brand Logo On It		Percent Offered a Free Cigarettes by a Tobacco Company	
	Never Smokers	Current Smokers	Never Smokers	Current Smokers
Total	22.8 (±1.7)	39.7 (±3.2)	18.0 (±2.7)	25.2 (±4.1)
Sex				
Boy	24.9 (±4.1)	43.3 (±3.6)	20.5 (±4.3)	29.2 (±8.8)
Girl	21.1 (±3.5)	36.3 (±7.0)	15.5 (±3.0)	21.5 (±6.6)
Region				
Belgrade	25.4 (±2.5)	46.0 (±7.3)	20.8 (±3.0)	22.8 (±6.5)
Urban	21.1* (±2.6)	37.6 (±4.0)	18.5 (±4.5)	24.5 (±5.8)
Rural	24.7 (±3.1)	41.1 (±7.6)	14.5 (±2.1)	32.3 (±9.3)

One in five (22.8%) never smokers and almost 4 in 10 current smokers (39.7%) reported having in their possession an object with a cigarette brand logo on it (Table 6C). Almost one in 5 never smokers (18.0%) and a quarter of current smokers (25.2%) reported having been offered a free cigarette by a tobacco company representative. There was no significant difference between boys and girls, or by region.

Table7: Access and Availability, Serbia GYTS, 2003

Category	Percent Current Smokers who Usually Smoke at Home	Percent Current Smokers who Purchased Cigarettes in a Store	Percent Current Smokers Who Bought Cigarettes in a Store Who Were Not Refused Because of Their Age
Total	18.5 (±3.2)	69.8 (±6.4)	92.4 (±3.2)
Sex			
Boy	13.7 (±4.1)	71.0 (±5.3)	88.4 (±4.6)
Girl	21.8 (±4.8)	68.8 (±11.9)	97.4 (±2.9)
Region			
Belgrade	15.0 (±4.6)	73.5 (±6.3)	93.1 (±5.6)
Urban	19.6 (±4.4)	70.3 (±9.1)	92.3 (±4.2)
Rural	17.9 (±7.2)	61.3 (±11.0)	91.0 (±9.5)

Almost one in five (18.7%) current smokers usually smokes at home (Table 7). Almost 7 in 10 current smokers (69.8%) purchased cigarettes in a store and 92.4% who bought cigarettes in a store were not refused purchase because of their age. There was no significant difference between boys and girls, nor across regions.

Discussion

Prevalence

More than half of 13-15 year old Serbian teenagers attending school have already smoked cigarettes and almost one-third of them had their first cigarette before the age of 10 years. Almost one-sixth of current smokers reported a desire to always have a cigarette first thing in the morning and one-fifth of never smokers stated that they were likely to initiate smoking during the next year. This shows that there is a high risk of addiction. These results indicate a high potential for tobacco use in later life and a potentially high prevalence of tobacco-related diseases (1, 3, 5).

Manufactured cigarettes are the most common item smoked in all regions. Less than ten percent of current smoker students use other forms of tobacco. The girls use a pipe very rarely.

The high prevalence of tobacco use among young people requires urgent intervention. The main assignment is to reduce smoking prevalence working on vulnerable population and impact to the habits, knowledge and attitudes, and neutralize and change behaviour risks. Peer education, media advocacy and partnerships are the most needed strategies for effective programs of health promotion and public health within the community (19, 22).

Cessation

More than one half of current smokers want to quit and more than three-fourths of them tried to stop smoking this year. But the majority failed. Two-thirds of current smokers received help to quit smoking. Young current smokers are not informed on where and how they can get help advice for stopping. These indicators are on the same level in Belgrade, rural and urban area. There is an opportunity for cessation program activity in the schools, in local community, in sports association and in health care facilities. The comprehensive guide emphasizes that effective treatment for youth tobacco cessation involves more than simply providing the right treatment components (23).

School Curriculum

Less than two-thirds of students had a class where they were taught the danger of smoking. Only two-fifths of students discussed reasons why people their age smoke and half of them were taught about of harmful effects of smoking.

This would seem to indicate that something is wrong with school curriculum. It is necessary that the format and content of the school curriculum be contemporary and based on evidence, and focused on the needs of youth. Youth-friendly communications strategies and approaches should be put into action. School-based smoking prevention and tobacco control should be integrated into several school subjects.

Environmental Tobacco Smoke (ETS)

Young people are very much exposed to tobacco smoke. The results of the 2003 Serbia GYTS show that an extremely high percentage of students (current and never smokers) is exposed to tobacco smoke both at home and in public places. Never smokers are less exposed to smoke from brothers, sisters and friends. There is big difference between current smokers and never smokers about thinking that smoking should be banned from public places and that tobacco smoke from others is harmful to them.

Knowledge and attitudes

For students, smoking is mainly a social activity, a way of making contact with peers especially of the opposite sex. There is no difference between boys and girls, either current or never smokers about making social contacts, but current smokers, boys and girls, think smoking makes them more attractive. They often concentrate on the short-term benefits of tobacco use, ignoring its harmful effects.

Media and Advertising

Students are affected by advertising and other media messages. The mass media has a responsibility in monitoring pro-tobacco use and anti-tobacco messages in advertisements. The survey results show that students are exposed more frequently to pro-smoking than to anti-smoking messages. In Serbia, there is no difference by gender and regions in anti-smoking and pro-smoking messages on TV, newspapers and magazines and sports events, fairs, concerts or community events. There is a difference in exposure to pro-tobacco message on billboards in Belgrade than in other regions (some of the respondents in the rural areas did not know what a billboard is as they had never seen one).

Significantly more current smokers than never smokers had an object with a cigarette brand logo on it, and more current smokers than never smokers had been offered free cigarettes by a tobacco company representative.

Laws and regulations about the advertising of tobacco products in the Republic of Serbia exist; however, they have to be applied and enforced. The primary conclusion is that a comprehensive ban on tobacco advertising and promotion is required; a partial ban has little or no effect (24). It has been estimated that every 10% increase in media anti-smoking campaign expenditures reduces cigarette sales by 0.5% (25).

Access and Availability

The majority of current smokers purchase their cigarettes in a store; over nine in ten current smokers who bought cigarettes in a store were not refused because of their age. One-fifth of them smoke at home. It is necessary to respect the law and ban the sale of cigarettes to persons under age, and perhaps to lower the age to 15 years from 18 years. Parents also have to be educated about the harmful effects of tobacco; so that they can help their children quit smoking.

Conclusions and Recommendations

Our findings indicate a high smoking prevalence among young people in Serbia. So there is need to reduce these percentages, otherwise the high morbidity and mortality ratios due to tobacco use can even increase in the future.

A comprehensive tobacco control and smoking prevention and cessation strategy needs to be adopted and applied. Social action at the community level is needed. The focus must be on health promotion, smoking prevention and cessation at schools and health promotion centers in primary health care facilities and in the local community. Existing tobacco control programs and media campaigns must be effective and new programs targeting children at the youngest possible age are needed. Those programs whose efficiency is demonstrated should be replicated at the national level. A Comprehensive Tobacco Control Program should include the following elements: schools-based programs, cessation, second hand smoke, media, and access/availability.

To achieve the above mentioned goals there some recommendations in details below:

- In schools including effective health promotion programs (workshops, discussion, face to face, etc.) and special lessons about danger and effects of tobacco smoking and tobacco marketing, etc., constitute over 60% of the young people. Moreover prevention has to be started in the children garden and that in the first elementary classes, because our date showed that teenagers tried smoking firstly during this period.
- It would be necessary to call parents and teachers attention to the importance of well-organized leisure time spending.
- Peer education also can have an important role because peer group influence is dominant in adolescent's social relation.
- There is an urgent need to develop and improve effective cessation programs too, because there is a demand for this among teenager smokers. Many regular smokers intend to quit, many of them have already tried it un successfully.
- Prevention and tobacco control programs must pay spatial attention to environmental tobacco smoking to make teenagers aware of the harmful effects of it. Young people exposure to environmental tobacco smoke both in the home and outside of the home is high. In addition, awareness of the effects of environmental tobacco smoke is limited. Community wide interventions are necessary to educate, encourage and support adults so that they can protect themselves and their children from environmental tobacco smoke.
- In can be necessary to make some change in the legislation especially ban in all public places (schools, health institutions, official buildings) media advertising, total ban on the TV, radio, newspaper, and billboards, and special ban promotion tobacco from young people, sponsorship sports event and other public manifestations from tobacco industry.
- It is necessary to establish regional and or local professional counselling ambulances assuring confidentially and privacy.
- Finally it is recommended that regular surveys also should be done to monitor the situation and the effectiveness of tobacco control and prevention programs, campaigns and actions.

Acknowledgements

The Canadian Public Health Association, World Health Organization-Tobacco Free Initiative and the Centres for Disease Control and Prevention (CDC) supported this survey financially and technically. The Ministry of Health, Republic of Serbia and Ministry of Education of the Republic of Serbia also supported this project.

We would like to thank Mr Jim Chauvin (Regional Coordinator for South East Europe, Canadian Public Health Association) and Mr Mike Parry (Project Director, Balkans Project, Canadian Public Health Association) for their support during the implementation of this project, analysis and completion of this final report. We also appreciate the financial support of the Canadian Public Health Association, through a contribution from the Canadian International Development Agency (CIDA), in support of the GYTS in Serbia.

We would like to thank also Dr Wick Warren (Distinguished Fellow/Statistician, Centre for Disease Control and Prevention) for his professional hard work during the whole survey and especially for analysis period. Many thank also to Ms Juliette Lee (Office on Smoking and Health, US, Centers for Disease Control and Prevention) and all colleagues in the CDC and WHO for their help.

We also thank Ms Ionela Petrea (Technical Officer, World Health Organization-Tobacco Free Initiative), Ms Galina Kaern (Programme Assistant, World Health Organization-Tobacco Free Initiative) and Dr Haik Nicogosian (Regional Adviser, Tobacco Free Initiative-World Health Organization Regional Office for Europe) for their support of this survey and especially for analysis period.

Our thanks go as well to Dr Snežana Ukropina (Institute of Public Health, Novi Sad), Dr Vlatka Stevanović. (Institute of Public Health, Užice), Dr Miroslava Dimitrijević (Institute of Public Health, Leskovac), Dr Mirjana Kićanović (Institute of Public Health, Požarevac), Dr Ana Bekić, Dr Dragana Jovanović and Verica Mirković, nurse at the Center of Epidemiology Institute for Oncology, Belgrade, and to all co-ordinators of health education for their support in organisation workshops and the survey.

Our gratitude also extends to the many educational workers and young people for their active participation in this survey.

We would also like to express our thanks to the National Committee for Smoking Prevention and to the Directors of the Institute of Public Health of Serbia and the Institute of Public Health of Belgrade for their comprehensive support of our work in this project.

References

1. World Bank Publication (1999), Development in practice, Curbing the epidemic, Governments and the Economics of Tobacco Control, Washington D.C.

2. Gajalakshmi C., Jha P., Ranson K., Nguyen S (2000). Global patterns of smoking and smoking-attributable mortality in: Tobacco control in developing countries, Oxford University Press

3. World Health Organization (2002): The Tobacco Atlas, Judith Mackay, Michael Eriksen, Geneva, Switzerland

4. World Health Organization, Regional office for Europe (2002): European Strategy for Tobacco Control, Copenhagen

5. Glanz S (1999): Tobacco Biology and Politics, University of California Press

6. Peto R, Lopez A., Boreham J., Thun M., Health C. Jr (1994): Mortality from smoking in developed countries 1950-2000. Oxford University Press

7. Zatonski W., Jha P (2000). The Health Transformation in Eastern Europe after 1990: A Second Look, The M. Sklodowska-Curie Memorial Cancer Center and Institute of Oncology, Warszawa.

8. Centres for Disease Control and Prevention, Targeting Tobacco use: The Nation's Leading Cause of Death, At a Glance 2003, www.cdc.gov/nccdphp/aag/aag_osh.htm

9. American Heart Association (2003). Heart and Stroke Statistics-Update

10. Atanasković-Marković Z. at all (2003). The Burden of Disease and Injury in Serbia. Ministry of Health of the Republic of Serbia. Belgrade.

11. Tobacco Control Country Profiles (2000): American Cancer Society, Atlanta (GA)

12. WHO, Regional Office for Europe (2003). European Country Profiles on Tobacco Control 2003. http://www.euro.who.int/tobaccofree/country/nf/20030812_1

13. Dželetović A., Gajić I., Krstić M., Ivanović I (2003). Women and smoking: prevalence and socio-economic determinants in Serbia, 12th World Conference on Tobacco or Health, Helsinki, Finland

14. Peijin Lj., Novotny E .T. (2003). The Economics of Tobacco Use in The Former Republic of Yugoslavia (FRY).

15. Institute for Social Medicine, Medical Faculty of Belgrade University (2000). Health Behavior of Secondary School and Student Youth, Belgrade

16. Bjegovic V.at All (1999). Health Behavior of School Children, Institute of Social Medicine, Belgrade

17. Serbian Government News Economy Serbia sells tobacco companies DIN, DIV for €605 million.htm (2003), http://www.serbia.sr.gov.yu/news/2003-08/04/33038.html

18. Serbian Government News Economy DIN, Philip Morris sign sell-off agreement.htm (2003). DIN, Philip Morris sign sell-off agreement. http://www.serbia.sr.gov.yu/news/2003-09/02/336678.html

19. Dželetović A. (2002). Evaluation of program activities aimed at eradication of smoking habit. Medicinska istraživanja, Časopis medicinskog fakulteta Univerziteta u Beogradu Vol.36, Sv.2: 60-63.

20. The 11th World Conference on Tobacco Or Health Seed Grant Program Report (2003) Prepared for the World Health Organization American Cancer Society

21. Serbian Society for the Fight Against Cancer (2003).: World No Tobacco Day in Belgrade: http://www.serbiancancer.org/Rak_septembar2003_br49.pdf

22. Dželetović A., Nikolić N., Kilibarda B (2002). Behavior change evaluation of youth related to tobacco use. 3rd European Conference on Tobacco or Health, Warsaw, Poland

23. Curry J.S, Editor (2003). Youth Tobacco Cessation: Filling the Gap Between What We Do and What We Know, *Am J Healt Behav,* 27 (Suppl 2): 99-102.

24. Jha P., Chaloupka J.F Brown Ph. (2000). Overview in: Tobacco control in developing countries, Oxford University Press

25. Kenkel D., Chen L (2000). Consumer information and tobacco use in: Tobacco control in developing countries, Oxford University Press